

**APPENDIX B**

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**BORCALLI & ASSOCIATES, INC.  
MEMORANDUM TO FILE  
EVALUATION OF BASIN E20  
DECEMBER 15, 2001**



## MEMORANDUM

**BORCALLI**  
&  
**ASSOCIATES, INC.**

CONSULTING ENGINEERS

TO: File

FROM: Francis E. Borcalli, P.E. *F. Borcalli*  
Michael C. Nowlan, P.E.

DATE: December 15, 2001

SUBJECT: North Vineyard Station Specific Plan Area, Drainage Master  
Plan (208-02) -- Evaluation of Basin E20

### INTRODUCTION

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In July 2001, the Sacramento County Board of Supervisors expressed a willingness to consider B&A's proposed concept for phasing construction of the Preferred Drainage Plan facilities for the North Vineyard Station Specific Plan (NVSSP). Subsequent to the Board of Supervisors meeting, B&A was requested, by the North Vineyard Station participating property owners, to develop a phased approach to implement the NVSSP. From initial coordination meetings with the Sacramento County Department of Water Resources (SCDWR), it became apparent that SCDWR considered it necessary to reevaluate the need for Basin E20 in the overall plan.

Accordingly, B&A performed an evaluation of Basin E20, as a component of the overall Drainage Master Plan for the Elder Creek and Gerber Creek drainage system. B&A's evaluation included a review of Existing, Stand-Alone, and Ultimate Conditions UNET models developed by Mr. Doug Hamilton, and creating Stand-Alone and Ultimate Conditions models with Basin E20 removed. The latter models were prepared to compare stages and discharges with and without Basin E20. These models all utilized a 100-year, 12-hour design storm based upon the hydrologic models currently accepted by Sacramento County, with simultaneous rainfall over the entire contributing basin(s).

To determine the sensitivity of the results and effectiveness of Basin E20, B&A also evaluated the impact to peak stages and discharges throughout the Elder-Gerber creeks system, with a 500-year event in the Elder-Gerber creeks system and the spill from Laguna Creek resulting from a 100-year event in the Laguna Creek system.

**ANALYSIS**

The need for Basin E20 was evaluated previously and reported in the document entitled, "Elder and Gerber Creeks Technical Appendix: UNET Analysis," prepared for Sacramento County by Mr. Doug Hamilton, January 1997 (Hamilton 1997). Hamilton 1997, reported a 0.5-foot stage increase downstream of the Sacramento City limits as a result of removing Basin E20 in the Stand-Alone Conditions. B&A requested models from Sacramento County to compare and review the information; however, these models were not available from Sacramento County. Although such a comparison would be helpful, it is not critical as the elements of the current models can be verified.

To analyze the impact of Basin E20 on the Elder Creek drainage system, B&A evaluated five UNET models: Existing Conditions, Stand-Alone Conditions without and with Basin E20, and Ultimate Conditions without and with Basin E20. The maximum stage profiles along Elder Creek for the respective models are shown on Figure 1. Presented in the table below are pertinent differences between the five models. The corresponding maximum discharge profiles are shown in Figure 2.

**Summary of Models for Basin E20 Evaluation**

Profile on Figure 1 and Figure 2	Land Use	Laguna Spill	Basin E20
1	Existing	Present	Removed
2	Stand-Alone	Present	Removed
3	Stand-Alone	Present	Present
4	Ultimate	Removed	Removed
5	Ultimate	Removed	Present

Stand-Alone Conditions without and with Basin E20 are shown on Profile 2 and Profile 3, respectively (Figure 1 and Figure 2). These are phased Stand-Alone Conditions models from B&A's work that include the NVSSP area developed, with all basins optimized, and Basin E24B used for flood storage. Removing Basin E20 results in a negligible stage increase upstream of the Elk Grove-Florin Road crossing, and a 210 cfs (on average) increase in discharge from the confluence with Florin Creek to the Elk Grove-Florin Road crossing. Even with this increase in discharge, the existing peak flows are not exceeded anywhere in the system.

The Ultimate Conditions maximum water surface (Profile 5), as shown on Figure 1, is significantly lower than the Existing Conditions (Profile 1). This is a result of channel improvements, increased detention storage, and eliminating the spill from Laguna Creek.

Upstream of Elk Grove-Florin Road, the Ultimate Conditions peak stage is approximately four feet lower than Existing Conditions. At the location of Basin E20, the Ultimate Conditions peak stage is approximately three feet lower than Existing Conditions. Under Ultimate Conditions, freeboard at several locations in the system is greater than Sacramento County's current requirement of one foot. The water surfaces under Ultimate Conditions could be designed slightly higher, as long as they do not reduce channel freeboard below one foot and local storm drains are designed accordingly. Presented on Profile 4 (Figure 1) are maximum peak stages under Ultimate Conditions without Basin E20. Removing Basin E20 results in a 0.4-foot stage increase and 127 cfs flow increase between the Southern Pacific Railroad (SPRR) crossing and the Elk Grove-Florin Road crossing. These increases diminish with distance from the Basin E20 location and are still significantly below Existing Conditions.

Excluding Basin E20 from the Drainage Master Plan results in an increase in peak stage and peak discharge in both Stand-Alone and Ultimate Conditions. However, the resulting maximum stage profiles are significantly below Existing Conditions throughout the Elder-Gerber drainage system (Figure 1), including downstream of the boundary between the City of Sacramento and Sacramento County. The resulting maximum discharge profiles are also below Existing Conditions throughout the system (Figure 2).

B&A also compared the Stand-Alone Conditions and Ultimate Conditions maximum stage profiles with Basin E20 removed, with existing top-of-bank elevations obtained from cross sections in the UNET model. Removing Basin E20 results in no significant stage increase in Stand-Alone Conditions, and a 0.4-foot stage increase above Ultimate Conditions with Basin E20, between the SPRR crossing and the Elk Grove-Florin Road crossing. With only a localized 0.4-foot increase above Ultimate Conditions, the peak stage is otherwise contained by the channel in remaining locations. Those locations at which the Ultimate Conditions stage is above the top of bank occur regardless of Basin E20. Therefore, fill at these locations would still be required for development to occur but would have to be raised to accommodate the localized increase resulting from the removal of Basin E20.

To further evaluate Basin E20, B&A determined the maximum water surface in Elder Creek with a 500-year, 12-hour storm event within the Elder-Gerber Creeks system with the 100-year, 12-hour storm in the Laguna Creek system. The results from this evaluation are presented on Figure 3. As shown on Figure 3, the impact of Basin E20 is essentially limited to less than a mile of reach downstream. The NVSSP area remains protected from flooding from the detention basins and channels.

## CONCLUSIONS

Based upon the analyses performed by B&A, the following conclusions are noted:

1. Basin E20 is not an essential component of the Drainage Master Plan for the Elder Creek and Gerber Creek drainage system.
2. Basin E20 is not required to mitigate impacts from development in the NVSSP area with the Drainage Master Plan facilities implemented under Stand-Alone Conditions and Ultimate Conditions.